SLATE DIGITAL

FG-X

Virtual Mastering Console

Dynamics Rack

- User Guide -

Slate Digital FG-X Virtual Mastering Console

Dynamics Rack Version 1.0

Advanced Algorithms™ by Fabrice Gabriel

Fabrice Gabriel:	Algorithm Design & Tuning
	Plugin Design
	GUI & Feature Design
Steven Slate:	Plugin Design
	Algorithm Design & Testing
Vincent Travaglini:	DSP Coding
	Plugin & GUI Development
Yannick Bonnefoy:	GUI Design
	3D Modeling & Rendering
Denis Rolland:	Metering and Panels Development

Thanks Jesse Dean, Deborah & Audrey Lintz, Alex Siegel, to all beta testers; and special thanks to Jay Baumgardner.

User Guide by Steven Slate & Fabrice Gabriel

©Slate Digital LLC. All rights reserved.

I. Introduction 4
II. Loudness vs. Necessity 4
III. Quick Start 5
IV. FG-X Dynamics Rack 6
IV.1. FG Comp 6
IV.1.1. In Use 7
IV.1.2. The FG Comp as a Leveler 8
IV.1.3. FG Comp Settings 8
IV.2. FG Level 9
IV.2.1. Transient Section 9
IV.2.2. Gain 10
IV.2.3. Dynamic Perception 10
IV.2.4. ITP – Intelligent Transient Preservation™ 10
IV.2.5. Constant Gain Monitoring™ 11
IV.2.6. Dither and Ceiling Settings 11
IV.2.7. In Use 12
V. Metering Section 13
VI. A Note for Mixing Engineers 15
VI.1. RMS Level 15
VI.2. Distortion 16
VII. Preset Toolbar 17
VII.1. Global Settings 18
VIII. System Requirements & Installation 19
VIII.1. Installation Instructions 19
VIII.1.1. iLok License Downloading 19
VIII.1.2. Installing the FG-X 19
IX. Conclusion 20

I. Introduction

Thank you for purchasing the Slate Digital FG-X Virtual Mastering Console Dynamics Rack.

This FG-X line of mastering processors was created to provide you with the most precise tools for the mastering stage. These processors use Slate Digital's "Advanced Algorithms". This term describes a unique and complex communication system between the DSP algorithms that make it possible to achieve new heights in signal processing.

This manual will help you understand the FG-X Dynamics Rack, and give you some tips on how to use the processors in the mastering stage.

II. Loudness vs. Necessity

As you are about to witness, the FG-X Dynamics Rack will give you the capability of making mixes very loud without the degrading artifacts that a mastering engineer commonly deals with when using peak limiting.

Therefore you hold in your grasp a great power, and we ask that you use it wisely. Regardless of the processor used, a record at -7dB RMS (more on RMS: VI.1 RMS Level, p.15) will never sound as good as one at -10dB RMS. Luckily, the general music buying population has now even become wise to the loudness wars and is demanding that it stops. We hope that you can use the FG-X processor sensibly, and not as a tool to show clients how loud you can now go without turning the mix into squash. If we all aim for an RMS goal of -10dB to -9dB, music will sound better, and maybe instead of "loudness wars" we can have "loudness parties".

III. QUICK START

Preset Toolbar

- Choose a preset which suits best your mastering goals.
- Use the A/B section to compare your settings.

VII Preset Toolbar, p. 17

FG Comp

- Choose a Ratio between 1 and 5 to smoothly compress the whole song dynamics, adjust the Threshold to get a gentle compression gain.
- By pressing the FG Comp settings button, you can adjust the Ratio and Threshold ranges.

IV.1 FG Comp, p.6

FG Level

- Push the gain to get the desired RMS level, adjust the LoPunch and Detail parameters to enhance transients.
- Then adjust the Dynamic Perception and ITP parameters to get the desired sound flavor.
- You can adjust the gain range in the FG Level setting panel, and adjust the output but resolution with the dither options.

IV.2 FG Level, p.9

Metering Section

- Adjust the Vu Meter settings according to your needs, and use the Reference RMS Level visualization to adjust the FG Level Gain.
- 1, 2 and 3 buttons gives you direct access to 3 different settings.
- Opening the Settings panel lets you fully customize the Metering Section.

V Metering Section, p.13

IV. FG-X Dynamics Rack

The FG-X Dynamics Rack consists of two main processors, the FG Comp and the FG Level. The FG Comp is a world class mastering compressor that combines several compression topologies to create the ultimate in transparent dynamic control. The FG Level is a loudness processor that uses a revolutionary new algorithm to add level without adding degrading artifacts. The FG Level also contains a dithering algorithm, which retains the sound of your higher bit rate audio files in their final 16 bit output.

IV.1. FG Comp

The FG Comp is an extremely transparent compressor aimed at mixbuss and mastering duties. Its algorithm is based on two different compression topologies, photo optical cell, and VCA.

Its controls are the same as are commonly found in compressors. The ATTACK parameter controls how fast the gain reduction reacts once the signal passes the threshold. The RELEASE parameter controls how fast the reaction time should be for the original signal to return to its original level once the signal drops below the

threshold. RATIO controls the amount of gain reduction applied once the signal passes the threshold.

IV.1.1. In Use

The FG Comp can add a tight, glue-like effect to your mix. Start with both attack and release at twelve o'clock and adjust from there, with the attack generally going slower and the release going faster. For adding more punch, slow attack and fast releases are suggested. For more transparency, you can slow down the release till the compression feels in time with the song.

The FG Comp requires VERY little gain reduction to be useful. Generally in the mastering stage, 1 to 2 dB of reduction will work fine, but even .5dB of reduction can give just the amount of tightness needed.

Be aware that many mixers use a mixbuss compressor and that there are cases where there will be NO NEED for any additional compression during the mastering stage. Don't use the FG Comp just because it's there, use it because your ears feel like the mix needs some extra leveling.

One reason that compression has been common in the mastering stage is because mastering engineers have to reduce peaks before using peak limiters to bring up the level of the mix. Because peak limiting is so destructive, reducing peaks first with a compressor allows them to use LESS peak limiting. However, as you will soon hear with the FG Level processor, there is much less need to reduce peaks.

Having said that, you may find that the FG Comp's sound can add an extra touch of magic - even on compressed mixes. Let your ears decide.

IV.1.2. The FG Comp as a Leveler

On very slow Attack and Release parameters, the FG-Comp acts like a leveler, as if someone moves a gain slider according to the input level.

The leveler mode of the FG Comp algorithm has been designed to retain all the punch and original transients of the mix, while reacting in an intelligent way to sudden global loudness changes in the audio.

This mode can be used in 2 ways:

- With a high ratio and threshold, to prevent too high RMS levels in loud moments of the song.
- With a low ratio and threshold, in order to reduce the difference between the relative RMS levels throughout the song.

IV.1.3. FG Comp Settings

Hit the settings button to access to the FG Comp settings.

You can adjust the Ratio and Threshold ranges of the compressor. Please note that these settings will be saved with the preset, but that the resulting values from the DAW automation will vary according to these selected ranges.

The In/Out metering options display the same settings than the Metering Section options. There are two additional options to:

- **Match Metering Section** settings: the FG Comp metering will then have the same display parameters than the Metering Section
- **Match Output Level**: the FG Comp metering level will be displayed according to the RMS Reference Level and the FG Level Gain. This allows having a RMS level display which matches the final output level of your master, and thus visualizing the FG Comp and Metering Section levels around the same 0dB reference RMS value.

Adjust the Gain Reduction Metering Settings to the maximum gain reduction. You can choose between Lin and Log gain reduction display scales.

IV.2. FG LEVEL

The FG Level can be used to make a mix louder while retaining the dynamic feel and punch of the original mix. It accomplishes this task by means of a new process called ITP, or "Intelligent Transient Preservation™".

ITP uses a complex algorithm to analyze peaks individually. It then creates an optimized set of algorithm parameters to "absorb" the peak in the most transparent fashion. For instance, ITP will optimize a particular curve that best accentuates midrange punch when processing the peak of a snare drum. It will optimize a curve for low end energy when processing a kick drum peak. The result is loudness processing that is transparent, and keeps the original punch and dynamics.

IV.2.1. TRANSIENT SECTION

The first section of FG Level is the TRANSIENT section. This section has two controls, LOPUNCH, and DETAIL. LOPUNCH can raise the level of the low end punch of the mix a/k/a the kick drum level. Detail will raise the level of the high end punch, such as snare drum. These controls are intended to be used to customize the amount of final transient articulation in the final master. It is recommended to leave them all the way down, and to apply them AFTER the GAIN. By hitting the Settings tab to the left of the TRANSIENT knobs, you can link both parameters.

IV.2.2. GAIN

The GAIN knob controls how much gain is added to the mix. As peaks approach the ceiling, they are processed via ITP as described earlier. The GAIN automatically goes to a built in ceiling which can be adjusted from -1 to 0dB.

IV.2.3. DYNAMIC PERCEPTION

The Dynamic Perception algorithm is a new process that adds perceived dynamics to mixes, even with very little dynamic range. Using this processor can add even more life and "movement" in your masters. Like the TRANSIENT knobs, start with it all the way off and gradually increase it after you have applied your desired gain with the GAIN knob. Setting the Dynamic Perception at around nine o'clock can add extra "movement" within the mastered song.

IV.2.4. ITP – INTELLIGENT TRANSIENT PRESERVATION™

The ITP slider can be considered the most important control in the FG Level. By moving the ITP slider up or down, you change the global characteristics of the saturation curves created by the ITP processor. When you raise the slider, the ITP processor uses more aggressive curves throughout the frequency spectrum, adding a slightly "hard" sound to the transients. The lower you push the ITP slider, the gentler the saturation curves become, making the final master sound smoother. Generally, placing the slider in the middle leads to the most transparent results. For modern pop, rock, and metal, moving the slider up is recommended for the most punch. For big bassy R&B or hip hop, the middle or slightly lower settings can retain a lot of sub bass.

IV.2.5. Constant Gain Monitoring™

The Constant Gain Monitoring button will decrease the output of the processor by the same amount as you add via the GAIN knob. This allows you to easily compare the original mix vs. the processed mix by enabling and disabling the power button on the FG Level. This simple feature can help you evaluate what FG-X is doing, without the added gain inherent in the process. This way, you are comparing the affected and unaffected audio.

IV.2.6. Dither and Ceiling Settings

By hitting this button, you are given a tab to customize your ceiling setting and dither bit value. It is recommended to keep the ceiling from -0.3 to -0.1. For CD masters, make sure to put the dither settings at 16bits.

IV.2.7. In Use

It is suggested that when first using the FG Level, you push the Constant Gain Monitoring button. This will allow you to start processing the mix while maintaining transparency.

Please note that the Metering Section still displays the master output levels with the Constant Gain Monitoring engaged. You can change this behavior in the Metering Section options.

Start by adding level to the mix via the GAIN knob. The inner meters in the meter panel will show you the RMS level. Start by pushing the GAIN so that during the loudest passages of the mix, the average RMS levels are about -10 dB FS.

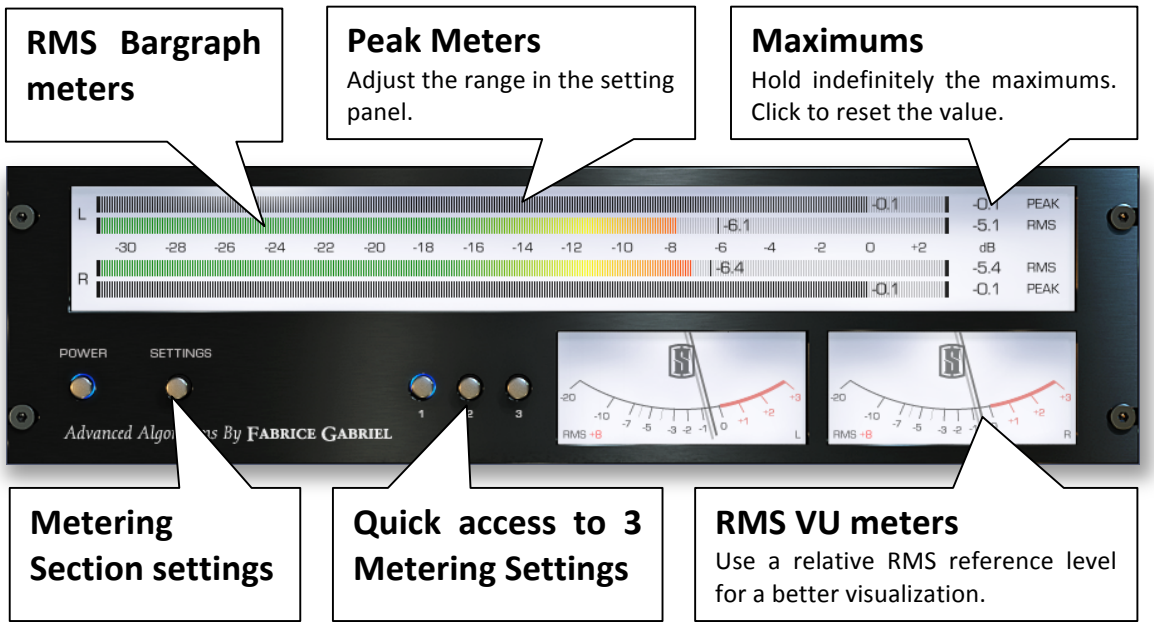
Disable the power button to hear what effect is being added to the mix. Many times you'll find the process is extremely transparent with no other tweaking needed. In some cases you'll need to adjust the TRANSIENT knobs in order to match or even amplify the original mix's punch. You can also dial in the DYNAMIC PERCEPTION knob to add better perceived dynamic feel to the master.

Once you have gotten the master to your desired level, turn your monitor volume down, disengage the Constant Gain Monitoring, and turn on the DITHER. Now you are ready to export your master.

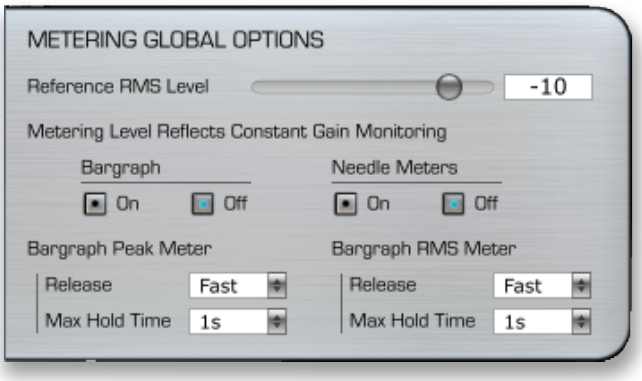
V. METERING SECTION

The FG-X meters allow you to view the mix peak and RMS levels in real time.

The bargraph displays the Peak and RMS output levels, and the VU meters display the RMS output level. The 1, 2 and 3 buttons give you direct access to 3 display settings of the metering section.

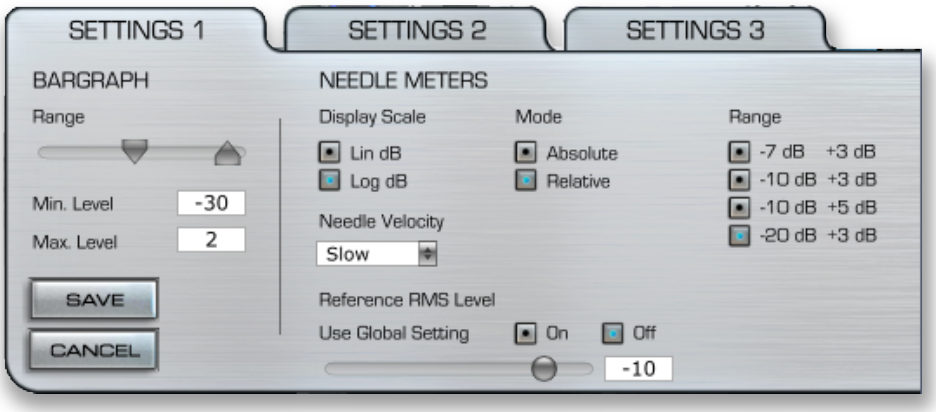


You can control many of the details of the metering section by hitting the SETTINGS button on the meter interface. From there, you can customize the meters in a variety of ways to best suit your workflow.



The global metering options let you adjust:

- **The Reference RMS Level**: the RMS level which will be used as the 0dB display reference of the metering section VU meters.
- **The Constant Gain Monitoring** behavior regarding the level display. Keep it off will just keep the metering the same display level as if Constant Gain monitoring button was turned off.
- **Bargraph Peak Meter** & **Bargraph RMS Meter**: adjust the release and maximum value hold time.



You can adjust for each of the Settings

- The bargraph display range
- The display scale:
    - **Linear dB**: gives a better precision across a limited range
    - **Log dB**: gives a wider range, with more precision in the upper range

- **Display mode**:
  - **Absolute**: use this mode to read the absolute level on the meter scale.
  - **Relative**: use this mode to read the level in a relative way. The 0dB of the scale is set according the "Reference RMS level" setting.
- **Range**: select the range according to the RMS dynamics of the song.
- **Needle Velocity**: adjust it to slow if you need a more average display, and to fast if you need
- **Reference RMS Level**: You can choose for each setting to use the Global Reference RMS Level or to set a particular Reference RMS Level.

VI. A Note for Mixing Engineers

The FG-X is essentially a mastering tool. But it can also be used effectively in the mixing stage, either as a buss compressor (using the FG Comp module) or as a powerful tool to give your clients a reference mix that is competitive with professionally mastered mixes. To this end, please be aware of your final plans once the mix leaves your hands. If the song is intended for mastering, you should remove FG-X before sending it to mastering, or if you are using the FG Comp as a buss compressor, you should bypass the FG Level module. Otherwise your mastering engineer will not have enough headroom to work with, since your FG-X processed mix will be reaching -10db, rather than the -20 to -15dB FS preferred level of an unmastered mix.

VI.1. RMS Level

RMS, or “root mean square,” is considered the standard for measuring loudness in audio. Typically, a mix should have an average RMS value of -20 to -15 dB FS (FS for Full Scale, i.e. 0dB or 16/24bits digital maximum). This leaves plenty of headroom for you to process the mix further in the mastering stage. By printing a mix higher then -15dB, you are not leaving enough room for the mastering stage processing. Mixes need to be MIXES, not MASTERS. If you are comparing your mix with a reference of an already mastered mix, lower the mastered mix by roughly 8dB. Do not try to match a mastered song’s level during the mix stage. **Leave loudness processing to the mastering stage.**

Mastered songs have an RMS of -11 to -8 dB FS. Some masters are pushed louder to -7 or even -6 dB FS. While the FG-X can certainly make these types of loud masters sound better than typical limiters have in the past, there is no way it will sound as dynamic, punchy, and “big” on the bottom end as a -10 dB FS RMS.

When we say -11 dB RMS, this refers to the loudest passage of the song (typically the chorus). For instance, a typical pop rock song can start out at -12 dB RMS for the verse, get to -11 dB RMS for the prechorus as more instrumentation is brought in, and then peak at an average of -10 dB RMS for the chorus as all the elements of the mix are in gear.

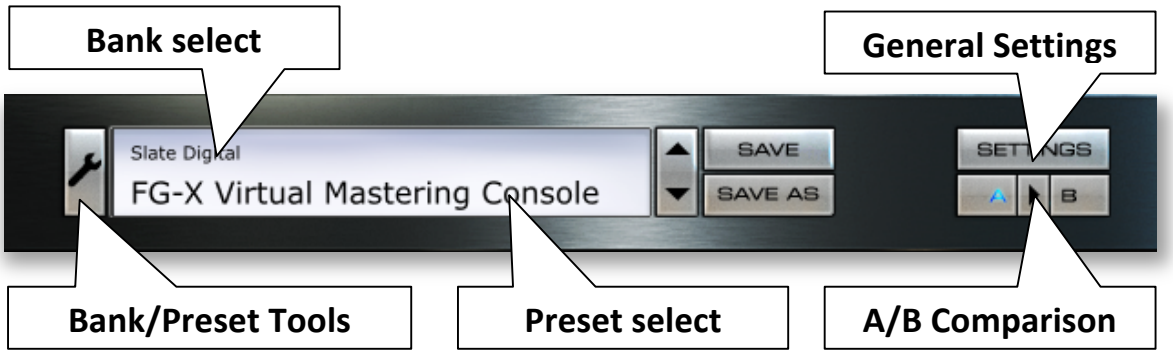
VI.2. Distortion

In the rare case that you hear distortion via the FG Level, follow these steps in order:

- Lower the ITP slider. This will make the curves gentler and 99% of the time will remove the distortion without affecting anything else. If you find you like the sound of the ITP slider when it is higher on a particular mix, simply automate the slider down during the portion of the mix where you hear distortion.
- Check the mix. Often times distortion is caused by an unbalanced frequency response within the mix. Usually, the unbalance is in the low end. Ensure that your mix doesn't have sudden bursts of **extreme** sub lows, or long low end resonances that are overbearing. To be clear, healthy sub low end is handled fine by the FG Level. Excessive distortion of your mix at RMS levels of -10 to -8.5dB is most likely an **INDICATION THAT YOUR MIX HAS POOR FREQUENCY BALANCE**. Make sure that before pushing a mix louder with the FG Level that you have properly balanced it with an equalizer, such as the upcoming FG-Q mastering equalizer.
- You're pushing the mix too loud. As powerful as the FG Level is, if you push the processor to unruly levels, such as -5dB RMS, it can still cause bits of distortion. Push the mix to healthy level of -10dB RMS to -9dB RMS.

VII. PRESET TOOLBAR

By hitting the toolbar at the top menu of the FG-X, you can set up your own user banks with saved FG-X settings. We recommend naming the bank after the album, artist, or project, and then saving each song's settings in the bank as a preset. This way if you ever have to revisit old masters, you can confirm a certain song's settings. You can also save your favorite presets for the compressor. Using the A/B setting switch on the upper right of the FG-X can allow you to easily compare two different settings.



To save a new preset, first hit "SAVE AS". After typing in your preset name, hit the ENTER KEY. This will now save your preset. If you make changes to your preset and want to instantly save them, hit the SAVE button.

Please note that you can't modify the factory presets which are installed with the plugin.

The preset tools allow you to create, rename, delete Banks and Presets, and to import and export Banks. You can also access these tools by right clicking on the Bank or Preset fields.

VII.1. Global Settings

You can adjust several global settings:

- **Value Display**: you can display the value when adjusting a parameter
- **Mouse Wheel Sensitivity**: click on a knob and use your mouse wheel to adjust the value. Adjust the mouse wheel sensitivity according to your needs.
- **Default Preset**: use this options to load the FG-X with the preset of your choice.

VIII. System Requirements & Installation

PC Requirements

- Hardware: any Intel or AMD processor with SSE2 support, 1 GB RAM
- Operating system: Windows Vista® (32/64 Bit), Windows 7® (32/64"Bit)

MAC Requirements

- Hardware: Mac PowerPC G5 or any Intel processor, 1 GB of RAM
- Operating system: Mac OS® X 10.4 or later

VIII.1. Installation Instructions

VIII.1.1. iLok License Downloading

- Before downloading the iLok license for FG-X make sure you have installed the latest iLok drivers for your system. You can download the latest installers here:
    - iLok drivers for Mac OS: http://sw.ilok.com/macextsx.dmg
    - iLok drivers for Windows: http://sw.ilok.com/DriverSetup.exe

In order to download your iLok license to your iLok dongle, please visit the link that was given to you in your email receipt and enter the required info including the issued passcode. This will unlock your iLok redemption code. Use this code via your iLok account's "Redeem License Code". Enter the iLok code, and then download the license on your iLok dongle.

VIII.1.2. Installing the FG-X

Click on the INSTALL icon. Choose your designated VST, AU, or RTAS folder (usually the default location that the installer insists will be best).

IX. Conclusion

We hope the FG-X Dynamics Rack helps you make your masters even better. For any support related issues, please visit www.slatedigital.com/support .

A note from Steven Slate:

"It all started when Fabrice Gabriel and I sat down at a conference table in early 2008, drinking coffee."The coffee in the US isn't quite like European coffee", he said to me. I didn't realize how right he was until recently visiting the Frankfurt Music MESSE in Germany. European coffee is just amazing.

But coffee was certainly not the main focus of our conversation that day. No, Fabrice and I were talking about music.

Both he and I had played music from an early age and we had shared a deep passion for it. Months later we'd be in my studio listening to classic tracks from Michael Jackson's Thriller and Stevie Wonder's Songs in the Key Of Life. But on that day I brought up something to Fabrice that really struck a chord in him. I told him that I thought peak limiting was destroying the music industry.

His eyes lit up and he slammed his coffee down on the table and said to me in a French accent "I know! This has troubled me for so long! There has to be a better way!"

And those words were the conception of the FG-X. Because he was right, there had to be a better way to make music louder in the mastering stage then what was currently offered. And to be honest, the only thing currently offered was this barbaric process of lookahead peak limiting which to my ears, was a one way ticket to making any mix sound WORSE.

So many digital plugin companies had a peak limiter. It seemed like standard procedure for every company to release their own. We tested dozens of them in hopes that maybe we'd find the one that would sound good and keep the audio intact, even at high gain additions. We failed in our search.

The only thing left to do was to build an entirely new mousetrap. It would prove to be one of the most difficult tasks we would ever undertake. Starting with sketches of concepts on pieces of paper, leading to over one hundred beta prototypes, with thousands of listening tests, and nearly three years of constant work, the FG-X was finally born.

And both Fabrice and I could not be more proud.

Finally, a tool that can accomplish something that, until now, has never been accomplished. Congratulations on getting the FG-X. We have found a better way.."

Steven Slate

A note from Fabrice Gabriel :

"Developing the FG-X Dynamics Rack algorithms was a big challenge. Every step of making this product become a reality has been a very long process, mixing algorithm innovations, intense listening sessions and a constant research for means of improvement.

We wanted to build a loudness processor which delivers the best sound quality with the most transparent algorithm processing, while giving the user a comprehensive but simple set of parameters which do not require the tedious tasks of searching for the right settings for hours.

I still exactly remember the first time we processed a mix with the right algorithm adjustments at Steven's studio. We looked at each other, thinking the same thing: "WOW! We got it!"

I'm also very proud of the FG Comp, which has a unique character and behavior. I designed this compressor algorithm with a mastering and transparency goal in mind. I can't believe myself how transparent and coherent this compressor is, even with high compression gain reductions, and I love the intelligent leveler mode, which I always missed in every compressor I tried.

The built-in metering section crystallizes what I was always dreaming about with regards to metering at the mastering stage. Last, creating the look and feel and the interface to ease use of these features was a major, collaborative effort.

Working with Steven was a wonderful challenge. I was always trying to fool his ears by giving him some blind algorithm tests, with some fancy option names to scramble the things even more!

Each time, he was able to pick the best algorithm settings, in both technical and audio quality standpoints. That's why the FG-X is far more than just a processing chain of algorithms: it has been fine-tuned by Steven's masterful ears."

Fabrice Gabriel

Thanks and happy mastering!

The Slate Digital Team